WHAT IS CLAIMED IS:

1. A catalyst for the full oxidation of volatile organic compounds (VOC), particularly hydrocarbons, and of CO to CO_2, comprising:

a non-stoichiometric crystalline compound conventionally designated by a formula which corresponds to $A_{14}Cu_{24}O_{41}$ (I), where A is Sr or a solid solution of Sr with alkaline-earth metals, alkaline metals, lanthanides; or a non-stoichiometric crystalline compound conventionally designated by a formula which corresponds to $B_4Cu_5O_{10}$ (II), where B is Ca or a solid solution of Ca with alkaline-earth metals, alkaline metals, lanthanides; or mixtures thereof; and in that it is prepared in a form which has a large specific surface area, preferably larger than 25 m^2/g.

2. The catalyst according to claim 1, further comprising a substrate material.

3. The catalyst according to claim 2, wherein the substrate material is a porous inert material.

4. The catalyst according to claim 3, wherein said porous inert substrate comprises a material chosen from the group constituted by Al_2O_3, ZrO_2, CeO_2, TiO_2, MgO.

5. The catalyst according to claim 1, in form of granules.

6. The catalyst according to claim 2, wherein said substrate is an inert substrate in the form of a thin film.

7. The catalyst according to claim 2, wherein said substrate is a composite material.

8. The catalyst according to claim 1, comprising 5% to 20% by weight of a non-stoichiometric crystalline compound conventionally designated by a formula which corresponds to $A_{14}Cu_{24}O_{41}$ (I), where A is Sr or a solid solution of Sr with alkaline-earth metals, alkaline metals, lanthanides; or a non-stoichiometric crystalline compound conventionally designated by a formula which corresponds to $B_4Cu_5O_{10}$ (II), where B is Ca or a solid solution of Ca with alkaline-earth metals, alkaline metals, lanthanides; or

mixtures thereof.

9. A method for full oxidation of volatile organic compounds (VOC), particularly hydrocarbons, wherein a catalyst according to claims 1 to 8 is used.

10. A method for converting carbon monoxide to carbon dioxide, wherein a catalyst according to claim 1 is used.

11. A method for preparing a catalyst comprising a non-stoichiometric crystalline compound conventionally designated by a formula which corresponds to $Sr_{14}Cu_{24}O_{41}$, comprising the steps of:

a) immersing a pre-dried granular porous substrate material in an aqueous solution with a molar concentration of $Sr(NO_3)_2$ from 0.23 M to 0.93 M and a molar concentration of $Cu(NO_3)_2$ from 0.39 M to 1.59 M;

b) drying at a temperature from 80°C to 120°C;

c) holding at a temperature from 650°C to 750°C in a gas stream which contains oxygen until complete decomposition of the nitrates occurs.

12. A method for preparing a catalyst comprising a non-stoichiometric crystalline compound conventionally designated by a formula which corresponds to $Ca_4Cu_5O_{10}$, comprising the steps of:

a) immersing a pre-dried granular porous substrate material in an aqueous solution of $Ca(NO_3)_2$ and $Cu(NO_3)_2$ in an equimolar ratio and at a molar concentration from 0.39 M to 1.39 M;

b) drying at a temperature from 80°C to 120°C;

c) holding at a temperature from 650°C to 750°C in a gas stream which contains oxygen until complete decomposition of the nitrates occurs.

13. A method for preparing a catalyst comprising a non-stoichiometric crystalline compound conventionally designated by a formula which corresponds to $Ca_4Cu_5O_{10}$, comprising the steps of:

a) immersing a pre-dried granular porous substrate material in an aqueous solution obtained by dissolving, with the application of heat, CuO and $CaCO_3$ in nitric acid, so that the molar ratio between the components of

the solution is CuO : $CaCO_3$: HNO_3 = 1 : 0.83 : 3.2; water and citric acid being added thereto so that the citric acid : Cu molar ratio is from 3.5:1 to 4.0:1;

b) heating in air until combustion of the organic fraction of the absorbed material is achieved;

c) thermal treatment for 4 to 24 hours at a temperature from 650 to 750°C in a stream of gas containing oxygen.

14. The method according to claim 11, wherein the porous material is constituted by Al_2O_3, ZrO_2, CeO_2, TiO_2, MgO.